

AGE AND POSITIONAL DIFFERENCES IN PSYCHOLOGICAL COPING SKILLS OF YOUNG FEMALE VOLLEYBALL PLAYERS

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(Original scientific paper)

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Abstract

With the aim of determining age and positional differences in psychological coping skills, 180 youth and junior female volleyball players, whose mean age was 15.91 ± 1.78 , filled out the Athletic Coping Skills Inventory-28 (Smith, Schutz, Smoll & Ptacek, 1995). Because of its poor reliability, the concentration scale was left out from further analyses. All other scales of the questionnaire have acceptable homogeneity, reliability and sensitivity. There were no statistically significant age and positional differences in coping skills found by independent samples T-test and One-way ANOVA. The results obtained indicate that levels of psychological coping skills do not change as the playing experience of female volleyball players increases, and that some other dimensions of anthropological status (primarily anthropometric characteristics) cause positional differences among young female volleyball players.

Key words: ACSI-28, metric characteristics, t-test, One-way ANOVA

INTRODUCTION

Morris (2000) states that elite athletes must constantly be under a high level of pressure, and it is therefore not surprising that psychological characteristics often distinguish successful elite athletes from those less successful. Athletic coping is the overarching concept that includes other psychological skills (Mahoney, Gabriel and Perkins, 1995). Coping with adversity is the ability to remain emotionally stable and positive during sport performance or competition no matter the situation (Weinberg and Gould, 2011), and to utilize other psychological skills and coping strategies. A number of multidimensional or one-dimensional instruments for measuring athletes' psychological characteristics are used in the area of sport psychology, and the *Athletic Coping Skills Inventory-28* (ACSI-28 hereinafter) (Smith, Schutz, Smoll and Ptacek, 1995) was developed as a research instrument, measuring psychological coping skills. This questionnaire is a revised version of the *Survey of Athletic Experience* (Smith, Smoll and Ptacek, 1990) questionnaire, constructed with the purpose of predicting coping with athletic injuries. The revised version of the questionnaire measures

seven out of the eight original dimensions, and the structure of the questionnaire had been determined by confirmatory factor analysis. ACSI-28 measures psychological characteristics important for predicting the enhancement of sports performance, and the results of all seven scales can be summed into a general measure of psychological coping skills. The authors state that ACSI-28 measures a multifacet construct and that each scale of the questionnaire can be used as a specific measure. Satisfactory metric characteristics have been determined for the questionnaire. Many research studies have been conducted by using this short and economic questionnaire in order to determine its metric characteristics. By testing the construct validity of the questionnaire, significant correlations were found to general self-esteem (Smoll, Smith, Barnett & Everett, 1993), as well as to a scale or subscales such as the scale of *worry* in the *Sport Anxiety Scale* (constructed by Smith, Smoll & Schutz, 1990) and to different measures of sports performance. Smith & Christiansen (1995), on a sample of professional baseball players, found that the results of the questionnaire, though representing an indirect measure of athletic success, signif-

icantly predict athletes' survival in professional baseball, while psychological coping skills measured by ACSI-28 were a more significant predictor of pitchers' efficacy than physical skills. Crocker, Kowalski & Graham (1998) state that ACSI-28 is not conceptually derived from any theory, and wonder if the questionnaire measures *coping* skills instead of targeted psychological skills, and that the items might have been selected for particular scales – dimensions without specific regard to previous research findings and contemporary theory. Weinberg & Forlenza (2012) state that certain critiques in literature are aimed at the procedure of development of the ACSI-28 questionnaire: they argue it is necessary to perform a procedure of confirmatory factor analysis on an independent subject sample, and not to repeat different analyses on data obtained on one sample; determination of construct validity should also include measures of psychological skills which are not measured by self-reporting procedures because all self-reporting measures have similar limitations. In spite of the mentioned limitations, the ACSI-28 instrument is considered a quality instrument for measuring psychological characteristics of athletes. The aim of this paper was to determine age and positional differences in psychological coping skills on a sample of young female volleyball players.

METHODS

The subject sample included 180 female youth and junior volleyball players of clubs from all parts of Croatia, who were members of the teams competing in the 2011 Croatian Championship, and whose mean age was 15.91 ± 1.78 . The largest group of subjects included players whose teams had entered the final tournament of the Croatian Championship for their age category. Besides them, the research also included the members of the teams which had not qualified for the final tournament of the Croatian Championship. The measurement of the subjects' psychological skills was performed by applying the *Athletic Coping Skills Inventory-28* (ACSI-28), constructed by Smith, Schutz, Smoll & Ptacek (1995). The inventory consists of 28 five-point Likert-type items, and measures 7 dimensions – facets: *coping with adversity* (abbreviation of variable COPE) which is used to measure athletes' way of coping with difficulties during performance (tendency to

remain positive and enthusiastic, to stay calm and controlled and to bounce back quickly from mistakes); *Peaking under Pressure* (abbreviation PEAK) which is used to measure athletes' ability to perform well under pressure; *Goal-Setting & Mental Preparation* (abbreviation GOAL) which is used to measure athletes' ability to set and work towards specific performance goals and to plan and mentally prepare themselves for performances; *Concentration* (abbreviation CONC) which is used to measure athletes' ability to be able to focus on the task at hand, to be able to maintain this ability to focus, and not to be easily distracted; *Freedom from Worry* (abbreviation FREE) which is used to measure athletes' ability not to put extra pressure on themselves by worrying about performing poorly or making mistakes, and not to be concerned with what other people will think about them if they do happen to make a mistake; *Confidence & Motivation* (abbreviation CONF) which is used to measure self-confidence and positive motivation of athletes who consistently give 100% and work hard to improve their skills; and *Coachability* (abbreviation COACH) which is used to measure the extent to which athletes are able to be open and learn from instruction, and to accept constructive criticism without taking it personally and becoming upset. As this inventory has not been used previously on a sample of Croatian athletes, it needed to be validated on this sample. The validation procedure started with the translation of the questionnaire, after which three volleyball experts agreed upon each item. Then the questionnaire was applied on a small sample of young volleyball players of both genders, primarily with the purpose of testing the content validity of its items. An item which had been marked by the subjects as less understandable or insufficiently applicable to volleyball was discussed again by the expert team. Besides measuring the psychological skills, other significant data about young volleyball players were also collected: year of birth and playing position (role) most frequently played in one's team. For the most part, the measurement of psychological skills by ACSI-28 was conducted through group testing during the final tournaments of the Croatian Championship for youth and junior players, just before playing the first match in the tournament. The remaining subjects, players from the teams which had not qualified for the final

Table 1 Means and metric characteristics of the ACSI-28 scales

VARIABLE	ITEMS	M	SD	CRONBACH'S ALPHA	% VAR	D * (K-S test)	MIN	MAX	SKEW	KURT
PEAK	4	2.92	0.85	0.76	58.36	0.08	1.00	5.00	-0.01	-0.23
FREE	3	3.13	0.87	0.71	62.99	0.11*	1.00	5.00	-0.03	-0.38
COPE	4	3.39	0.70	0.67	51.29	0.10	1.50	5.00	-0.22	-0.09
CONC	4	3.47	0.64	0.57	46.02	0.09	1.75	4.75	-0.01	-0.26
GOAL	4	2.80	0.85	0.76	58.63	0.11*	1.00	5.00	0.05	-0.48
CONF	4	3.72	0.66	0.69	53.04	0.10*	1.50	5.00	-0.28	0.44
COACH	4	3.85	0.71	0.70	53.33	0.13*	2.00	5.00	-0.67	-0.24

M – mean; SD – standard deviation; CRONBACH'S ALPHA – coefficient of internal consistency; % VAR – percentage of the explained variance; D (K-S test) – coefficient of the Kolmogorov-Smirnov test; * - the level of significance of the K-S test coefficient; MIN – minimum result; MAX – maximum result; SKEW – measure of distribution asymmetry; KURT – measure of distribution shape.

Table 2 Correlations of the ACSI-28 scales

VARIABLE	PEAK	FREE	COPE	GOAL	CONF	COACH
PEAK	1.00	-0.04	0.31***	0.30***	0.32***	0.12
FREE	-0.04	1.00	-0.36***	0.10	-0.17*	-0.24**
COPE	0.31***	-0.36***	1.00	0.19*	0.56***	0.32***
GOAL	0.30***	0.10	0.19*	1.00	0.55***	0.13
CONF	0.32***	-0.17*	0.56***	0.55***	1.00	0.30***
COACH	0.12	-0.24**	0.32***	0.13	0.30***	1.00

* - statistically significant coefficient of correlation at the level of $p < .05$; ** - statistically significant coefficient of correlation at the level of $p < .01$; *** - statistically significant coefficient of correlation at the level of $p < .001$.

tournament of the Croatian Championship, were measured later in their clubs. For validation of the scales of the translated ACSI-28 questionnaire of psychological skills, basic metric characteristics were determined: homogeneity (by using principal components analysis with oblique rotation); reliability (by calculating the Cronbach's alpha coefficient); and sensitivity (by calculating the Kolmogorov-Smirnov test of distribution normality, as well as the coefficients of skewness and kurtosis). In case a low level of reliability or unsatisfactory homogeneity had been established in some scale, item analysis was performed for that scale with the purpose of improving its metric characteristics. In order to be able to compare the results of scales with a different number of items, the result of each scale was calculated by summing each item within the scale and then dividing that sum with the number of items in that scale. Coefficients of the independent samples T-test were calculated to determine possible differences in psychological coping skills between the subjects according to age, and differences in the level of psychological coping skills between the subjects with different player roles were tested by One-way ANOVA.

RESULTS AND DISCUSSION

Given that the ACSI-28 questionnaire has not been validated earlier in Croatia, the validation of the instrument was performed and the results of validation of each scale on a sample of young female volleyball players are presented in Table 1.

Only the *freedom from worry* scale required an additional item analysis, and after the analysis had been performed, one item was discarded so the scale contains the total of three items. Therefore, all validated scales of the questionnaire, except for the *freedom from worry* scale, consist of 4 items. All scales have good homogeneity because items in all the scales were projected on a single latent component, and the variance explained by these components varies between 46.02% for the *concentration* scale and 62.99% for the *freedom from worry* scale. Scales' reliability of the internal consistency type (Cronbach's alpha) ranged between the satisfactory level of 0.76 for the *peaking under pressure* and *goal setting/mental preparation* scales and the unacceptable level of 0.57 for the *concentration* scale. Similar reliability levels were also found by the authors Smith et al. (1995) when they constructed the scales, but they did not find any Cronbach's alpha coefficients of reliability

Table 3 Differences of the ACSI-28 results according to the age of the examinees

VARIABLE	FEMALE YOUTH PLAYERS (N=105)		FEMALE JUNIOR PLAYERS (N=75)		AGE DIFFERENCES	
	M	SD	M	SD	t-test	p
PEAK	2.83	0.89	3.03	0.77	1.59	0.11
FREE	3.23	0.89	2.98	0.83	1.88	0.06
COPE	3.38	0.72	3.40	0.68	0.13	0.90
GOAL	2.83	0.84	2.77	0.87	0.41	0.68
CONF	3.70	0.64	3.75	0.68	0.56	0.58
COACH	3.85	0.73	3.86	0.70	0.04	0.97

M – mean; SD – standard deviation; t-test – coefficient of the independent samples t-test;
p – level of statistical significance.

Table 4 Differences of the ACSI-28 results according to the playing position of the examinees

PLAYER ROLE		VARIABLE					
		PEAK		FREE		COPE	
		M	SD	M	SD	M	SD
Setter	(N=32)	2.79	0.84	3.15	0.95	3.51	0.72
Opposite player	(N=27)	2.89	0.74	3.05	0.87	3.43	0.74
Passer-hitter	(N=54)	2.84	0.84	3.11	0.87	3.31	0.75
Middle blocker	(N=37)	3.02	0.79	3.05	0.89	3.49	0.65
Libero player	(N=30)	3.08	1.01	3.30	0.81	3.25	0.63
ANOVA		F		F		F	
		0.73		0.43		0.93	
		p		p		p	
		0.57		0.79		0.45	
PLAYER ROLE		VARIABLE					
		GOAL		CONF		COACH	
		M	SD	M	SD	M	SD
Setter	(N=32)	2.73	0.98	3.74	0.65	3.86	0.76
Opposite player	(N=27)	2.81	0.79	3.64	0.68	3.80	0.83
Passer-hitter	(N=54)	2.81	0.88	3.68	0.73	3.81	0.65
Middle blocker	(N=37)	2.91	0.85	3.79	0.64	3.92	0.64
Libero player	(N=30)	2.74	0.75	3.77	0.54	3.89	0.78
ANOVA		F		F		F	
		0.24		0.31		0.18	
		p		p		p	
		0.92		0.87		0.95	

M – mean; SD – standard deviation; F – coefficient of one-way analysis of variance;
p – level of statistical significance of the F coefficients.

lower than 0.60. During the construction of the questionnaire, it was established that, among all the scales, the *concentration* scale had the lowest coefficient of internal consistency (0.62). Since factor loadings of all items of this scale were 0.64 or higher, and only one latent component was extracted, it was not possible to perform further selection of items. Tennenbaum, Kamata & Hayashi (2007) state that many researchers recommend 0.70 as a minimum criterion value for a measure to be considered internally consistent,

though they do not recommend this criterion as a magic number. Some authors (Nunnally & Bernstein, 1994; Abell, Springer & Kamata, 2009; Milavica, 2013) argue that levels of consistency lower than 0.70 are also acceptable if the measuring performed by an instrument with low consistency is not the basis for decision making which would have consequences for a person, if the data is analyzed and interpreted at a group level, and in early phases of research. In simple terms, items of the *concentration* scale measure manifest behav-

iors which do not provide a sufficient reliability level of the measuring, and there is no way to improve the reliability of this scale. Therefore, it has been decided that this scale would be excluded from further procedures of statistical data analysis, so the *concentration* scale was not further used in this research. Even though the results of the Kolmogorov-Smirnov test show that distributions of 4 out of the 7 variables differ with statistical significance from normal distribution, the sensitivity of the scales is considered to be good because all coefficients of skewness and kurtosis fall within ± 1.00 , and ranges of the results (the smallest scale range is between 2.00 and 5.00) spread through 3 or more measuring units of the scale. It has been concluded that the validated measuring scales (except for the *concentration* scale) have good metric characteristics, and the use of parametric statistical data analysis procedures of their results is therefore justified. The means obtained on the scales of psychological coping skills on this subject sample vary between moderate 2.80 (*goal setting/mental preparation* scale) and moderately high 3.85 (*coachability* scale). The obtained results show that the technique of goal setting is least used by young female volleyball players with the aim of coping with adversity. This scale consists of three items which measure the usage of goal setting and only one item which refers to creating a mental plan for playing the match. By ranging the means of items of this scale only, by far the lowest result (2.45) was achieved precisely on this item of *mental preparation*. After goal setting, female volleyball players also do not “look forward to” playing under pressure, and do not cope with game pressure in a desirable way. *Coachability* (3.85) and *confidence* (3.72) were found to be positively most expressed coping skills. The volleyball players are open for coach’s instructions, they are ready to listen and accept constructive criticism. They are also confident, believe in their playing abilities, and are intrinsically motivated for training and improvement in volleyball. By comparing the findings of the present research on a sample of young female volleyball players with the female part of the sample used to construct the ACSI-28 questionnaire (Smith et al., 1995), comprised of female high school athletes from different sports, it is noticeable that the ranging structures of means are almost identical in both studies. In the original

research, the lowest results were also found in the measure of *goal setting/mental preparation*, and the highest results were found in the measures of *coachability* and *confidence*. As the majority of the subject sample of the present research also includes female high school students, it can be concluded that young female athletes, regardless of the culture and their chosen sport, cope with difficulties and problem situations in sport in a very similar way. The analysis of age and positional differences might allow further and better interpretation of these findings as well.

The correlations between the measures of psychological coping skills are presented in Table 2. The correlations among the scales of psychological coping skills are mostly positive, except to the measure of *freedom from worry* whose correlations are mostly negative because the items of the scale are negatively oriented. The measures of *confidence/motivation* and *coping with adversity* express the highest correlation to the other variables, which indicates their highest level of importance and their “central” place among the measures of psychological coping skills. Considering the correlations found between the measures of psychological coping skills, further investigation of their relations is recommended because some of the measures might have a common latent basis. Moreover, due to the correlations found between the variables, it is recommended for future research to apply multivariate statistical procedures in order to determine the partial contribution of each variable while excluding the contribution of other variables which are related to that one.

There were no significant differences in the measures of psychological coping skills between the players of youth and junior age category. Coefficient of difference of only one measure of psychological coping skills (the measure of *freedom from worry*) is very close to the level of statistical significance. The measure of *freedom from worry* is very similar in terms of content to the measure of *cognitive state anxiety* in the CSAI-2 questionnaire of athletic psychological skills. Milavić, Jurko & Grgantov (2013) found significant differences between youth and junior female volleyball players in cognitive state anxiety, but also in somatic state anxiety and self-confidence. The authors considered the lower level of somatic and cognitive anxiety and a higher level of self-

confidence in juniors as opposed to youth players to be expected and explained it by greater experience of junior players and their generally higher level of technical-tactical skills as a consequence of a longer period of training and competing. In their opinion, junior players' better performance of volleyball elements in training sessions probably has a positive effect on their self-confidence level, and thereby on decreasing cognitive and somatic state anxiety in matches, while a greater number of matches played probably contributes to a less expressed cognitive and somatic anxiety. The findings of the present research differ from the findings of Milavič et al. (2013) as no significant differences were found in self-confidence, and merely a tendency to differentiate was found according to the measure of *freedom from worry*. The inconsistency of differences in these two studies might be interpreted based on the differences between metric characteristics of scales of the two questionnaires by which different findings had been obtained. Namely, each of the three scales of the CSAI-2 questionnaire (cognitive and somatic state anxiety, and self-confidence) consists of 9 items, Cronbach's alpha coefficient of reliability of each scale is 0.84 or higher and each scale measures only one psychological construct. As opposed to this, all scales of the validated questionnaire have only 4 or 3 items each, the levels of the Cronbach's alpha coefficient of reliability vary between 0.67 and 0.76, and two of the scales measure two different psychological constructs (*goal setting/mental preparation* scale and *confidence/achievement motivation* scale). Even though more reliable measures are not necessarily more valid as well (Vaughn, Lee & Kamata, 2013), differences of metric characteristics of scales should be considered as a possible source of inconsistency of the obtained results. It is recommended to repeat the research by using the ACSI-28 questionnaire on a larger subject sample, but also to investigate the relations between the measures of the ACSI-28 and the CSAI-2 in order to accurately determine the relations between different measures of psychological characteristics.

Given the fact that no significant differences were found between female volleyball players of different age groups in this research, the players can be considered members of the same population. Therefore, the next step in statistical analysis,

the One-way ANOVA, was applied on the overall sample of female volleyball players. Differences in the level of psychological coping skills between the groups of subjects with different player roles within their teams were tested by analysis of variance.

There were no significant differences found in the level of psychological coping skills between the players with different player roles in their teams, in spite of the differences in characteristics of tasks they perform during a match or a training session. Players in positions of *setters* organize every attack with great performance precision expected; two "positions" of players who perform serve reception (*liberos* and *passer-hitters*) demand great performance precision of this volleyball element, while *opposite players* in attack "win" crucial points by spiking. The obtained results indicate that players in different playing positions in volleyball have equal levels of psychological coping skills. It might be assumed that positional differences are caused by some other factors and not by a level of psychological coping skills. As in the present research, there were also no differences found in the earlier research by Milavič et al. (2013) in the level of psychological characteristics (*cognitive* and *somatic state anxiety*, and *self-confidence*), measured by the CSAI-2 questionnaire, between youth players, and then junior players, playing in different positions. Positional differences have been established in scientific literature, but those differences are a consequence of differences in anthropometric characteristics (Gualdi-Russo and Zaccagni, 2001; Trajković et al., 2011), and in some motor abilities (Duncan et al., 2006; Marques et al., 2009). The findings of the present research, and the review of the scientific literature, indicate that the most frequently used variables for player specialization of young female volleyball players are anthropometric variables, followed by variables of functional-motor abilities, and to the smallest extent, variables of psychological characteristics. Further research is recommended which should include a longitudinal study of positional differences between young female volleyball players, and which would use all three sets of measures: anthropometric, psychological and functional-motor measures.

CONCLUSION

Translation and validation of the Athletic Coping Skills Inventory-28 (ACSI-28) was conducted in the present research on a sample of young Croatian female volleyball players. Good homogeneity, reliability and sensitivity was obtained for all scales of the questionnaire, except for the *concentration* scale, which creates the necessary prerequisite for good assessment of the psychological coping skills level. The *concentration* scale did not meet the required level of reliability and it was excluded from further statistical analysis procedures.

The obtained results indicate that the level of psychological coping skills does not change with the increase of playing experience. The findings are not congruent with the findings of previous studies (Milavić et al., 2013; Milavić, 2013) which have found differences in some psychological character-

istics (anxiety, self-confidence and concentration) between youth and junior female players. A detailed comparison of measures from different questionnaires used is recommended with the aim of precisely determining the differences between female players of different age groups.

There were no positional differences found in female players by using the analysis of variance. Thus, it can be concluded that positional differences cannot be well explained based only on psychological coping skills. Taking into consideration the findings of both this and previous research studies, it is evident that positional differences among young female volleyball players in this subject sample are mostly caused by other dimensions of the anthropological status (anthropometric characteristics, motor abilities, technical-tactical skills, etc.)

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ГОДИШНИТЕ И ПОЗИЦИСКИТЕ РАЗЛИКИ ВО ПСИХОЛОШКИТЕ ВЕШТИНИ КАЈ МЛАДИТЕ ОДБОЈКАРКИ

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(Оригинален научен труд)

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Абстракт

Со цел да се утврдат возрастните и позициските разлики во психолошките вештини реализирано е истражувањето на примерок од 108 млади одбојкарки со просечна возраст од 15.91 ± 1.78 . Испитаниците пополнива прилагоден прашалник за проценување на психолошките вештини под името Inventory-28 (Smith, Schutz, Smoll i Ptacek, 1995). Поради слабите мерни карактеристики подskalата концентрација е изоставена од понатамошната анализа. Сите останати скали од прашалникот имаа задоволителна хомогеност, валидност и осетливост. Т-тестот за независни примероци и едномерната анализа на варијансата не покажаа статистички значајни возрастни и позициски разлики во психолошките вештини. Добиените резултати укажуваат дека со зголемување на играчкото искуство кај одбојкарките не се менува нивото на психолошките вештини и најверојатно некои други димензии на антрополошкиот статус (првенствено антропометриските карактеристики) се причина за позициските разлики кај младите одбојкарки.

Клучни зборови: ACSI-28, мерни карактеристики, t-тест АНОВА